

WHAT IS CLAIMED IS:

1. A printed circuit board (PCB) comprising:
  - a first section having a first dielectric constant (DK);
  - a second section having a second DK lower than the first DK, and provided above or below the first section;
  - at least one crosstalk compensation element provided in the first section; and
  - at least one circuit element provided in the second section.
2. The PCB of claim 1, wherein the first section includes:
  - a first laminate having the first DK;
  - a first prepreg above the first laminate; and
  - a second prepreg below the first laminate.
3. The PCB of claim 2, wherein the first and second prepregs have the first DK.
4. The PCB of claim 3, wherein the at least one crosstalk compensation element is provided at a metal sheet of the first laminate.
5. The PCB of claim 3, wherein the second section includes:
  - a third prepreg above the first prepreg;
  - a first metal layer above the third prepreg;
  - a fourth prepreg below the second prepreg; and

a second metal layer below the fourth prepreg.

6. The PCB of claim 5, wherein the third and fourth prepregs have the second DK.

7. The PCB of claim 6, wherein the at least one circuit element is provided at the first and/or second metal layer, and the at least one crosstalk compensation element is provided at a metal sheet and/or a dielectric substrate of the first laminate.

8. The PCB of claim 3, wherein the second section includes:

a second laminate above the first prepreg; and

a third laminate below the second prepreg,

wherein the second and third laminates have the second DK.

9. The PCB of claim 8, wherein each of the second and third laminates includes a dielectric material substrate and a single metal sheet on the substrate.

10. The PCB of claim 9, wherein the at least one circuit element is provided at the single metal sheet of the second and/or third laminate, and the at least one crosstalk compensation element is provided at a metal sheet and/or a dielectric substrate of the first laminate.

11. The PCB of claim 1, wherein the second section includes:
  - a first laminate having the second DK;
  - a first prepreg above the first laminate; and
  - a second prepreg below the first laminate.
12. The PCB of claim 11, wherein the first and second prepregs have the second DK.
13. The PCB of claim 12, wherein the first section includes:
  - a third prepreg above the first prepreg;
  - a first metal layer above the third prepreg;
  - a fourth prepreg below the second prepreg; and
  - a second metal layer below the fourth prepreg.
14. The PCB of claim 13, wherein the third and fourth prepregs have the first DK.
15. The PCB of claim 14, wherein the at least one crosstalk compensation element is provided at the first and/or second metal layer, and the at least one circuit element is provided at a metal sheet of the first laminate.
16. The PCB of claim 1, wherein the first DK is in the range of 4.0 – 5.0, and the second DK is in the range of 2.5 – 3.5.

17. The PCB of claim 1, wherein the at least one crosstalk compensation element includes a plurality of capacitors placed at different compensation stages of the PCB.

18. A method of maximizing a capacitance area of a printed circuit board (PCB) while minimizing signal transmission delays in the PCB, the method comprising:

- (a) providing a PCB having a first section and a second section above or below the first section, the first section having a first dielectric constant (DK), the second section having a second DK lower than the first DK;
- (b) providing at least one crosstalk compensation element in the first section of the PCB; and
- (c) providing at least one circuit element in the second section of the PCB.

19. The method of claim 18, wherein in the providing step (a), the first section includes:

- a first laminate;
- a first prepreg above the first laminate; and
- a second prepreg below the first laminate,

wherein the first laminate and the first and second prepregs have the first DK.

20. The method of claim 19, wherein in the providing step (a), the second section includes:

- a third prepreg above the first prepreg;
- a first metal layer above the third prepreg;
- a fourth prepreg below the second prepreg; and
- a second metal layer below the fourth prepreg,

wherein the third and fourth prepgs have the second DK.

21. The method of claim 20, wherein in the providing steps (b) and (c), the at least one circuit element is provided at the first and/or second metal layer, and the at least one crosstalk compensation element is provided at a metal sheet and/or a dielectric substrate of the first laminate.

22. The method of claim 19, wherein in the providing step (a), the second section includes:

- a second laminate above the first prepreg; and
- a third laminate below the second prepreg,

wherein the second and third laminates have the second DK.

23. The method of claim 22, wherein the providing step (a) includes:

- removing one of two metal sheets from each of the second and third laminates.

24. The method of claim 23, wherein in the providing steps (b) and (c), the at least one circuit element is provided at the remaining metal sheet of the second and/or third laminate, and the at least one crosstalk compensation element is provided at a metal sheet and/or a dielectric substrate of the first laminate.

25. The method of claim 18, wherein in the providing step (a), the second section includes:

a first laminate;

a first prepreg above the first laminate; and

a second prepreg below the first laminate,

wherein the first laminate and the first and second prepgs have the second DK.

26. The method of claim 25, wherein in the providing step (a), the first section includes:

a third prepreg above the first prepreg;

a first metal layer above the third prepreg;

a fourth prepreg below the second prepreg; and

a second metal layer below the fourth prepreg,

wherein the third and fourth prepgs have the first DK.

27. The method of claim 26, wherein in the providing steps (b) and (c), the at least one crosstalk compensation element is provided at the first and/or

second metal layer, and the at least one circuit element is provided at a metal sheet of the first laminate.

28. The method of claim 18, wherein in the providing step (a), the first DK is in the range of 4.0 – 5.0 and the second DK is in the range of 2.5 – 3.5.

29. The method of claim 18, wherein the providing step (b) includes:  
placing a plurality of crosstalk compensation capacitors at different compensation stages of the PCB.